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THE IMPORTANCE OF GEOGRAPHY IN EDUCATION*

I

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THE place of geography in education may be considered under three aspects, and I will distinguish those three aspects by the shortest phrases I can find. Geography in one aspect or sense is the gateway to the physical sciences; in the second aspect it is the key to history; and in the third it is the basis of commerce. These three aspects in which it may be regarded correspond to the different parts of school, college and university work, and they have to be carried out and conducted to some considerable extent by a different part of the educational staff of a school or college or university, and yet each of the three has very important relations to each of the others. That is especially true with regard to the first two, and yet the third is also in intimate relations to the two former. He who wishes to understand geography in any one of these three aspects ought to know something about it in the other two aspects; and he will find that what he knows about it in any one of the aspects, of which the first is after all the most fundamental, will help him to comprehend and to apply his knowledge in the other two.

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Let me begin with geography as what I have called the gateway of science. We may say that man touches nature, the external world of nature, in two points. First of all he touches it through the constitution of his own physical body. As possessing a body he is himself part of nature and he comes into relations with it through that body. The study of these relations belongs to the sciences which we call physiology and biology. Then he also touches it in another way. He touches it through the external world, the phenomena of which he learns through his senses and in which he is placed to do his work. Geography may be described as being the general science of the Earth, perhaps I ought to say of the Earth as a part of and affected by other parts of the material universe, but in the first instance and for our more immediate purpose, of the Earth which we inhabit. Geography is the science which takes for its province the describing to us of everything that relates to the Earth.

All branches of knowledge which have anything to tell us about the Earth more or less hinge into or are connected with geography, or you may if you like say they diverge from it as specialized departments of that general knowledge which it presents in its connection with the whole. For instance, geography takes account of the solid crust of the Earth. The solid crust of the Earth is the special subject of three sciences, geology, mineralogy and palæontology, which therefore diverge from geography as being specialized branches of the science which it presents in a general way. Then you have a second divergent branch in meteorology and oceanography, dealing with the phenomena of the air and vapor and the closely cognate phenomena of the great masses of condensed vapor which exist on the surface of the Earth in the form of oceans. A third branch is that represented by the sciences of botany and zoology, describing the living creatures which find their home and their sustenance on the Earth. A fourth, a little more remote, consists of the sciences of physics and chemistry, which deal with the constituents of the globe and of the forces which move them. The forces which you see in operation on the Earth belong to the science of physics, and the study of the constituent elements of the Earth, the methods by which they are analyzed and the combinations which they form belong to the science of chemistry. Even astronomy, although it carries us beyond the limits of our terrestrial globe, is really closely connected with the science of the Earth, inasmuch as many terrestrial phenomena are sensibly affected by the phenomena which lie beyond

the globe, and cannot be understood without a comprehension of astronomy.

The whole of this great group of physical sciences, each of them re-divided and specialized into numerous branches and departments, springs from geography as the centre of the group. Physical geography in particular shows the relation which each of these branches of science bears to the others and the way in which all taken together have an influence upon the life and development of man. One may figure the thing by saying that geography is a sort of great central hall from which there open out numerous doors leading into apartments, each of these being dedicated to some particular one of the sciences which are connected with the Earth and its phenomena. All the apartments find their meeting point, their point of convergence, the place through which the student must pass from one to the other, in the science of geography which stands in relation to them all alike (or almost alike). Therefore in this sense you may say that geography constitutes the approach to all the physical sciences. It is the science which brings them all into correlation with one another; it is the science through which you can best observe the action of each of them upon the life of man. Thus it holds a highly significant place in education. Students who are going to devote their attention mainly to the physical sciences find geography a starting point; it indicates the relations of the sciences to one another, for all are connected with the external nature in the midst of which we stand.

Students who are not going to devote their attention to the natural sciences, but to what are called the human subjects—literature, history, philology, economics, and so forth—again find in geography the point in which these subjects have their contact with the physical sciences. If such students are given at the starting of their career a due comprehension of the numerous bearings and relations which geography has to all the other sciences that deal with physical phenomena, they are better able to specialize in those special human branches of study which they intend to pursue, having gathered the relation which they all, through geography, bear to physical science.

That is the first point in which I venture to think geography may claim an exceedingly important part in the general scheme of education. It gives the student a proper conception of the relation of the sciences of nature to the sciences of man, and shows how the different sciences of nature are related to one another.

Further, geography and more particularly physical geography upon its practical side, becomes of the greatest value as a training in the art of observation. Physical geography, like other kinds of geography, used to be taught mainly out of books, and the pupil was allowed to have very slight contact with facts which he could see for himself. Happily all that has been changed, and I am glad to know that now in this country, as has for some time past been the case in Germany, it is thoroughly realized by all progressive teachers that geography must be made as much as possible an experimental science —experimental in this sense, that the pupils' minds must be brought into contact with facts and not words, that they must be taught to connect what they read and what they hear from their teachers with the actual facts they are trained to observe for themselves. All competent teachers of geography have now begun to feel that they ought to start out by giving the scholar a direct personal knowledge and not a mere book knowledge of the meaning of geographical terms and the elementary data of physical geography; that he ought to be taken around the place in which he lives; that he ought to be shown hills, or mountains, if he is fortunate enough to have mountains in his neighborhood, and notice the rocks they are made of; that he ought to be taught to observe the courses of rivers and brooks; that he ought to be led to study the inclination of hills and the structure and features of an undulating country, or of plateaus or of riverine plains; that he ought to be taught to observe the trees and the vegetation generally which appertain to particular kinds of soil, or to particular exposures; and to keep his eyes open and his memory alert to watch the winds and the rainfall and to acquire a knowledge of the climate of the region in which he lives. All these things about which he reads in his text-books of physical geography ought to be made real and vital and full of meaning to him, by being connected with the actual facts which he can note and remember when they are shown to him, but which he probably will not notice unless they are pointed out to him. He lives among them, but he may never observe them (unless he is an exceptional boy), until his attention is called to them. Physical geography communicated in that way by an active-minded and intelligent teacher, becomes one of the best possible means of training in the art of observation, an art which might appear easy and natural, but which in reality requires a good deal of training, because no one knows, until some incident calls his attention to it, how many of the phenomena among which he moves he has failed to observe.

Thirdly, from observation the study of geography passes into the stage of reflection and combination, that is to say, those phenomena which have been made real to the pupil by his being taught to observe them, have to be suggested to him as subjects for inquiry and brought into a causal relation with one another in order that he may ask himself, What has been the source of these facts I see in external nature, and how are they connected with one another? He must be taught whenever he is shown a fact in physical geography to inquire into the cause, and whenever there are two facts to ask what relation, if any, there is between them. What connection, for instance, is there between the inclination of the hills, whether gentle or steep, in a mountainous district and the character of the rocks and amount of rainfall in that district? What connection is there between the growth of trees and the rainfall and the prevalent winds? In that way physical geography will teach the pupil to acquire the habit of looking at a region as a whole, so that when there is any district which he has got to know by his own observation he will begin to reflect and seek to discover what have been the physical causes which have gone to make this district what it is, and what relation exists between those various causes.

It is extraordinary how little most of us will observe of these matters if we are left to ourselves. Ask yourself how many people among your acquaintance there are who have any intelligent knowledge of the weather, that is to say, who are in the habit of observing the direction from which winds come, and the phenomena of the sky which indicate fair weather or dull weather or rain respectively? You will find, I think, that they are extremely few. It is a rare thing to meet even a man living in the country who has made an intelligent study of the weather and who constantly observes the winds, who knows from what kind of wind and from what aspect of the sky certain weather may or may not be expected. Of course we all know that the predictions of the best weather prophets even aided by barometers and reports from outlying signal stations are uncertain. But, at the same time, there is a great difference between the man who can make a tolerable forecast of what sort of weather may be looked for on an afternoon fixed for a picnic, and the man who has no data at all for an opinion, but thinks, as so many people do, that it is going to be fine at 3 p. m. because the sun is shining at 9 o'clock in the morning. In the same way, it is odd how very few people there are who notice the vegetation of the district in which they dwell. One is often surprised to find how few persons among those

who are in a general way observant and intelligent, have noticed that particular trees and particular plants and flowers grow upon particular kinds of soil, or under particular physical conditions. If you were to ask, for instance, one of your ordinarily intelligent friends who lives in the country if he could tell what plants are characteristic of chalk soils, or what kind of soil it is that any particular tree, let us say a fir or a beech, prefers, you would be surprised to find how few there are who could give you an intelligent and correct answer to such a question. Yet observation of this kind does not require any special botanical knowledge. There are persons who do not possess that special botanical knowledge, who could give those answers, but they are comparatively few. That is a third advantage which I claim for the study of geography as a gateway to science, that it may be made an admirable training not only in observation but also in reflection upon the phenomena lying all round us in external nature which we know from an observation that is within most people's reach.

Fourthly, the study of geography in this way adds immeasurably to the pleasure of travel. We all of us enjoy in increasing measure at the present time opportunities of travel by land and sea, and for one person who crossed the Atlantic from the continent of Europe to the continent of America fifty years ago I suppose there are at least twenty or thirty who cross now, while for one person who crossed the channel to France fifty years ago there are a hundred now. How few people use adequately the opportunities for the observation of physical phenomena, or indeed for observation of a kind which travel gives, or who possess the amount of knowledge required to enable them to observe properly and to get the full enjoyment which travel is capable of yielding. There is no greater pleasure to be derived from travel than that of learning something about the country one is visiting. You cannot properly understand a country, unless you have a knowledge of the fundamental facts of its physical geography and have formed the habit of observing them. Without this, you cannot form a true conception of a country as a whole. Sometimes I have fancied it would be worth while to try and provide at one of our universities some systematic instruction in the kinds of knowledge and skill in observation which come chiefly into play in travel. There was a book written some thirty or forty years ago by Francis Galton, called "The Art of Travel in Wild Countries," which describes a great number of devices which the traveller will find useful in dealing with savage

men and overcoming the difficulties of wild nature. There is also another and very useful book of a similar kind called "Hints to Travellers," which has appeared since and gone through several editions. But perhaps there is still room for a book more comprehensive than either of these, and less scientific than the latter, more on the level of the unscientific mind, taking in some matters which do not belong to physical science at all. Such a book might suggest to travellers or tourists how to observe the relation of the rocks to the scenery, what the relation of the rocks is to the vegetation, what is the relation of the climate to the vegetation, and how to estimate the productive capacity of a country, how to learn something about its races, about its antiquities, about its economic conditions, and about its languages or dialects. When one takes a long ocean voyage, one is surprised to find how small a number of persons there are on board who know anything of trade winds or monsoons or ocean currents, other than the now familiar yet often not very well understood Gulf Stream. Yet how much such a knowledge adds to the pleasure of travel. Such a book might be elementary enough to be fit for persons possessing no special mastery either of science or of history. It would not replace either of the books I have referred to, but it might be useful to a somewhat wider public.

(To be concluded.)

SOURCES OF LITERATURE FOR COMMERCIAL GEOGRAPHY

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THE subject of Commercial Geography is one to which much attention is now being given by teachers in high schools and universities of this country. Commercial courses of various sorts are being organized to satisfy a demand for education which shall give mental training and at the same time be a specific preparation for business life. In the attempt to satisfy this need, teachers have turned to Commercial Geography. This is a subject which, until very recently, has not possessed adequate text-books. The boundaries of the subject are at present uncertain and even the precise objects to be attained in the study are under dispute.

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There can be no doubt, however, that a study which shall give general and systematic instruction regarding the structure, processes and geography of modern industry will prove of great utility. Something is needed which shall be more to the point in training young men for business life than sociology or economic theory, but yet which shall not be so narrowly technical as the courses in schools of technology, engineering schools, textile academies, commercial colleges or institutions which fit for any special occupation.

The field which lies open is a most attractive one to the teacher, but he must expect to do pioneer work within it. The study brings one constantly into close contact with the live and energetic world of trade. There is not only the opportunity but the necessity of constantly adding new knowledge and so placing it that its significance is developed to the fullest extent. There is also the satisfaction of knowing that the study will prove of great practical benefit to the majority of those who pursue it.

The subject of Commercial Geography is not an easy one to teach with any degree of success. While facts are only significant to the teacher as they give the clue to the underlying forces which condition facts, nevertheless in any field where the underlying forces are no more clearly defined than in Commercial Geography it is very essential that the facts should be correct and typical. We are all familiar with the statement frequently made that a book on science is out of date in ten years. It is quite probable that industry changes its methods more rapidly than science does its hypotheses and the relative strength of competitive industries, neighborhoods and nations is in constant change. It is a necessity therefore that the teacher of Commercial Geography shall be in constant touch with the best current trade literature.

It may be taken for granted that in so wide a field as the study of the principles of productive industry, no text-book can present more than a fraction of the necessary knowledge which should come out in the class-room. The teacher who knows no more than the text cannot be a success. The teacher who cannot explain why Birmingham, Alabama, with great supplies of coal and iron ore cannot produce Bessemer Steel; why the new cotton mills of the south centre more in the Piedmont region than in the cotton belt; why the manufacture of ready-made clothing cannot be made to succeed in the small cities of New York State as it does in New York City; why Iowa with so many dairy cows cannot support cheese factories,

etc., will be buffeted from pillar to post by an enterprising class. Whether the text-book contains it or not, the teacher should know, for each industry considered, the chief controlling forces which determine the location, growth and the success or failure of the industry. He should know also something of industrial history and be able to freshen up the entire discussion by an account of recent important movements in the world of trade.

The literature which will convey this needed material is unfortunately sparingly found in high school or even college libraries. It is the object of this paper to suggest some of the more valuable sources of literature. First to be mentioned are the publications of the Federal Government. The Department of Agriculture publishes annually a "Year-book" in which are articles on agriculture, horticulture, animal industry and forestry. The Division of Forestry has published an illustrated "Primer of Forestry." The Weather Bureau has many publications and maps of interest in teaching meteorology. Some pamphlets chosen at random to give an idea of the range of interests covered by the Department of Agriculture are as follows: "Milk Supply of Boston and Other New England Cities," with maps; "Forestry Conditions and Interests of Wisconsin," with maps; "Rice Culture in the United States"; "Agricultural Resources of Hawaii"; "Life Zones and Crop Zones of the United States," with very important map; "The Fruit Industry."

The Monthly Summary of Commerce and Finance, published by the Bureau of Statistics of the Treasury Department, occasionally contains a monograph on some trade. Some businesses already treated in the monthly numbers are as indicated below:

Jan.	1900.	Grain Trade of the United States.
March	1900.	Cotton Trade of the United States.
Sept.	1900.	Coal Trade of the United States.
Nov.	1900.	Lumber Trade of the United States.
Dec.	1900.	Shipping Industry of the United States.
July	1901.	Porto Rico, Hawaii, Philippines, etc.
Jan.	1902.	Sugar, Production and Consumption.

The volumes of the tenth and eleventh Censuses and the Bulletins of the twelfth Census, now appearing, can be put to almost constant use in the study of American industry. There are besides this, such sets as the "Report of the Industrial Commission," in sixteen volumes; the "Commercial Relations of the United States," in two volumes, issued annually by the Department of State; the "Report of the Philippine Commission,' published in 1900, in four

volumes, and the Report on "Mineral Resources of the United States," in two volumes, published annually by the United States Geological Survey.

A second valuable source of information for teachers is to be found in the trade periodicals. Often these constitute the only source, as in the case of many manufacturing industries and most lines of wholesale and retail trade. The matter appearing in the trade papers is more varied than in formal treatises and government documents, and through them current developments can best be followed. The library of no high school where commercial studies are taught is complete without a careful selection of the leading trade and technical papers of the country. They are valuable to the teacher for his own education, make possible the assignment of topics for research, and prove, by their well-thumbed condition, their attractive power with the students. The trade periodicals of no other country maintain so high a standard of excellence as those of the United States. Where so many are good, it is hard to say which is best.

The JOURNAL OF GEOGRAPHY, realizing the need of teachers of Commercial Geography for illustrative matter for class use, has set aside a department in which notes on Commercial Geography will be published. In connection with these a brief table of the more valuable articles appearing in the chief general and trade publications will be given each month. From this service, which the JOURNAL OF GEOGRAPHY provides for its readers, it will be possible for any teacher to determine which papers are best suited to his individual needs. It will be possible with the use of the monthly reference list to buy separate copies of trade papers and magazines containing articles desired. From the examination of these numbers a list for subscription can be made up for personal or school use. The file of a trade paper, when bound, constitutes an encyclopædia of information on the trades in the interest of which it is published.

The following papers and magazines have expressed an interest in the adaptation of trade periodicals to the use of students and teachers of Commercial Geography and are on the exchange list of the JOURNAL OF GEOGRAPHY.

Textile Record of America,	Monthly,	$3.00,	Philadelphia.
American Agriculturist,	Weekly,	$1.00,	New York.
Commercial Bulletin,	Weekly,	$4.00,	Boston.
Engineering Magazine,	Monthly,	$3.00,	New York.
Engineering Mining Journal,	Weekly,	$5.00,	New York.

Bradstreet's,	Weekly,	$5.00,	New York.
Hide and Leather,	Weekly,	$3.00,	Chicago.
Clay Worker,	Monthly,	$2.00,	Indianapolis,
St. Louis Lumberman,	Monthly,	$1.00,	St. Louis.

Other publications which will prove valuable for special uses are:

New York Commercial,	Daily,	$5.00,	New York.
Consular Reports,	Monthly,	gratis,	Department of State.
Manufacturer's Record,	Weekly,	$4.00,	Baltimore.
Scientific American,	Weekly,	$3.00,	New York.
The Manufacturer,	Semi-Mo.,	$3.00,	Philadelphia.
World's Work,	Monthly,	$3.00,	New York.
Dry Goods Economist,	Weekly,	$5.00,	New York.
Mississippi Valley Lumberman,	Weekly,	$2.50,	Minneapolis.
Popular Science Monthly,	Monthly,	$3.00,	New York.
The Tradesman,	Semi-Mo.,	$2.00,	Chattanooga, Tenn.

CERTAIN PERSISTENT ERRORS IN GEOGRAPHY*

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IN many of the old text-books on geography used in the schools to-day old legends which were taught as truths a generation or more ago still survive, in spite of the fact that they have been discredited by geographers for many years. In consequence, these incorrect ideas are still accepted by the great mass of the people, and it is probable that another generation will pass before the truth will filter down from geographers into the text-books and from the text-books to the people.

An example of the persistence of error is the idea that the presence or absence of forests has an influence upon the amount of rainfall. Some keen observer long ago detected the fact that forested regions enjoyed a heavier rainfall than those not forested, and jumped to the conclusion that rainfall was produced by forests, and, as a corollary, that the removal of forests diminished the rainfall. Looking over the earth he found many treeless deserts, and semi-

*Reprinted by request from the *Bulletin* of the American Geographical Society, XXXIII., No. 3, 1901, pp. 259–264, and with the consent of the editor and author.

desert regions, and forthwith instanced them as frightful examples of the result of man's wastefulness in destroying the forests. Prominent among these examples are the shores of the Mediterranean, including the Iberian Peninsula, Italy, northern Africa, and Syria, which are often quoted as favorite illustrations of man's destruction of climate by his destruction of the forests.

In reply to this charge man can certainly plead not guilty. If his accusers had possessed a little more knowledge of the climate and the conditions which modify it they would have seen at once that the geography of this Mediterranean region, the present configuration of the land and water, and the prevailing winds are such as to give it a light rainfall, forests or no forests. Furthermore, a knowledge of physiography would have taught them, in corroboration of the above, that the arid or semi-arid conditions now existing must have existed for many thousands, if not millions, of years, for the mountains, cliffs, and canyons are such as are carved only in arid regions, are not those of a moist climate, and these forms have not been made in a day. The situation is simply that the cart has been placed before the horse. Want of rain prevents the growth of trees; want of trees does not prevent rain. This is generally accepted among physical geographers, but the majority of the people still reverse cause and effect.

A persistent, widespread, and well-rooted error is the belief that floods in our rivers are greater and more frequent than formerly, and that this is due to the removal of forests from their drainage areas. Every great flood induces another flood of editorial paragraphs in the newspapers to the effect that man, by clearing away forests, has increased the flood-height of streams, and correspondingly diminished the low-water flow.

It is probable, although it has not been proved, that the clearing of land, by cutting away the forests and undergrowth, does change the regimen of streams, increasing their flood-height, and diminishing the flow at low stages. In other words, water probably runs off or evaporates more rapidly from bare ground than from ground which is covered with trees or other forms of vegetation. But where the forests are cut away the land is seldom left bare; it is cultivated or quickly becomes covered with bushes, which hold the water quite as effectively as forests.

The main fact, however, is that the floods in our rivers are no greater or more frequent than in the past. The Ohio river, for instance, has been gauged continuously for many years, and these

gaugings show no appreciable change in regimen, whatever changes may have been made in the forest cover of its basin.

In the school geographies we are taught that the fiords of the coast of Norway, those deep gorges, partly filled by the sea, are proof that the coast has been sinking. How could such canyons be cut, it is asked, unless at the time of their construction they were above sea-level? But to-day, on the coast of Alaska, we see just such canyons in course of construction below sea-level. On this coast are scores of glaciers travelling in gorges which, near their lower ends, are many hundred feet below the level of the sea. The Muir Glacier, where its front meets the sea, is over 800 feet thick, 600 feet of which is below the level of the water, and this, like all other glaciers, is constantly carving its bed deeper. The Norwegian fiords were cut by glaciers, and, probably, while the sea and land were at the same relative levels. The coast of Norway may be sinking, but its fiords are not evidence of it.

Other familiar errors concern climate still more directly. The well-known mild climate of the northwest coast of America is commonly attributed to the balmy influences brought to it by the Japan Current; the Gulf Stream is supposed to have the same influence upon the west coast of Europe; and the cold climate of the east coast of the United States is attributed to a supposed current from the Arctic Ocean hugging this coast.

That these explanations do not explain will be realized after reflection. Can it be supposed that the Japan Current, however warm it may be when it leaves the tropics, retains any appreciable amount of heat after a journey of 6,000 miles in northern latitudes? As a matter of fact, no trace of this current reaches the shores of North America, its force being entirely lost thousands of miles to the westward. There is nothing left but the merest drift of surface water before the prevalent west wind.

In the North Atlantic the condition is much the same. The Gulf Stream loses its velocity and disappears as a current long before the British Isles are reached. That the cold climate of the eastern coast of the United States is caused by an Arctic current close inshore is disproved by the fact that there is no such current along the coast.

There is probably no phenomenon connected with the physical life of the earth which has been the subject of greater misconception than the currents of the sea. The maps of the school books are covered with lines and arrows, indicating currents in every conceivable direc-

tion, every temporary drift of surface water reported by navigators having apparently been recorded as a current.

The system of oceanic currents is very simple: a drift of water towards the Equator, a current along with it, flowing westward to the land, there dividing, flowing north and south and disappearing.

This equatorial current has been attributed in the text-book to a variety of causes. The unequal heating of sea water in different latitudes is a favorite explanation. This, however, could produce currents only by changing the volume of the heated water, and, unfortunately, if the water under the Equator was appreciably expanded by heat, it would cause currents in the opposite direction from those which exist. We should find them flowing away from the Equator instead of toward it.

Another explanation given is the increased evaporation in the tropics, thus lowering the surface of the water and causing an inflow from north and south. Were this of any appreciable magnitude it would undoubtedly cause a drift of water to equatorial regions, but there would be no corresponding outflow, such as the Gulf Stream and Japan Current.

A third cause assigned is the diminution of atmospheric pressure on the sea in the tropics, produced by the heating of the atmosphere and its consequent rarefaction. This amounts to a fraction of an inch in the barometric column, and is, therefore, a small matter. Undoubtedly, if it had an appreciable effect upon the sea, this effect would take the form of a slight flow of water toward the Equator; but, when equilibrium was thus established, there would be no further flow toward the Equator, nor would there be any flow at all away from it.

Still another cause assigned is the increase in density of the water under the Equator, due to excessive evaporation, thus increasing the saltness of the water. It is difficult to see what effect would thus be produced were it appreciable.

The true cause of the ocean currents is sometimes mentioned in the text-books, but, excepting in two of the most recent ones, is given little or no prominence. The initial cause is the trade-winds. These blowing constantly from the northeast and southeast, induce a drift of the surface water equatorward. These two drifts meeting near the Equator flow along it westwardly, developing into a well-defined equatorial current. In the Atlantic this current, after flowing across the ocean, impinges on Cape St. Roque, Brazil, where it divides. The smaller part turns southward and skirts the coast of South America,

fading out near the latitude of Cape Horn. The northern and much the larger part flows through the Caribbean Sea and the Gulf of Mexico, gathering strength and momentum in the narrow passages through which it is forced by the body of water behind it, and enters the Atlantic through the Strait of Florida. Here in the open sea it rapidly widens, shallows, and loses its velocity, and in the middle Atlantic is reduced to a mere drift, gradually turning southward to repeat its long journey.

What takes place in the Atlantic takes place on a much larger scale in the Pacific. Here from all parts of that great ocean within the tropics the surface water is driven to the neighborhood of the Equator by the trade-winds. Along the Equator it flows for thousands of miles in a great current. On reaching the land it divides, and the southern portion subdivides time after time, and finally is lost among the maze of islands constituting Australasia. The northern part skirts the Japanese islands, gradually turning to the northeast, as it gets under the influence of the prevailing westerly winds, and soon disperses in the great waste of water of the North Pacific.

These are the great oceanic movements. They are initiated by the winds, and their course is modified by the winds and by the shores. Besides changing the courses of the main currents, the shores and islands divide the currents, sending off numberless little minor streams of water in various directions.

The land absorbs heat rapidly and as rapidly cools. Water, on the other hand, is heated slowly and holds its heat longer. Moreover, the sea is constantly in motion, its waves, tides, and currents—especially the latter—tending to create a uniform temperature throughout its mass. In consequence of all these conditions the sea has a much more uniform temperature in its different parts, and at different times, than the land. It is warmer in high latitudes and cooler near the Equator; it is warmer in winter and cooler in summer. It follows, further, that the coast upon which the prevailing wind is from the sea shares in this amelioration of climate, while the interior of continents and coasts upon which the prevailing winds are from the land do not share in this amelioration of climate.

Here we have the application of all that has gone before. Upon our northwest coast the prevailing winds are from the west, from the sea, and they bring to the coast the climate of the sea, which is warmer, on an average through the year, than the land, and also much warmer in winter and much cooler in summer. The coast of Europe is under similar conditions, while the east coast of the

United States and of northern Asia is under reverse conditions. Here the prevailing winds, still being from the west, come from land, and they give these coasts a continental or land climate, which is much colder in winter and warmer in summer. As was stated before, the cold climate of the east coast of the United States has been attributed to an Arctic current flowing close inshore. If there were such a current, it could have no effect upon the climate of this coast, since the prevailing winds are from the west, and could not bring the cold of the sea to the land.

There is a widespread notion that, in a mountainous region, all divides between streams must consist of mountain ranges, and in most maps ranges are shown in such positions, whether they exist or not. A mountain range may or may not divide drainage basins, and a divide may or may not consist of a mountain range.

Another mistake is the assumption that the highest peaks are always situated on the crest of a mountain range. This is their most common position, but in many cases the highest peaks are situated on spurs, at a distance from the crest.

We still find on many maps the main system of the Cordillera of North America represented as running in a direct line to the Arctic Ocean, just west of the mouth of the Mackenzie, in defiance of the well-known fact that the main mountain system follows the coast through Alaska, and forms the backbone of the Alaskan Peninsula.

THE WEAVERS OF THE "WESTERN ISLES."

BY AGNES VINTON LUTHER.

"IT is a far cry" as the Scotch would say, from the busy woollen mill with its rattle of looms and din and whirr of machinery to the isolated cottages of the Hebrides where the island weavers make by hand, slowly and laboriously, the tweeds for which Harris has become so famous.

To locate the island of Harris one has only to look at the map of Scotland, with its west coast line, "all tattered and torn" like the garb of the man in the nursery rhyme. Pick out of the hundreds of islands there the outermost lying group. Harris and Lewis form practically one island of the outer Hebrides.

It is hard to explain the impression Harris makes on the visitor. It is well that the "amphibious nature of the country" as the Irishman put it, prevents one from going directly to this island in too short a time. Nature has her own way of keeping us from the goal until we have learned the lessons by the way, and one can not

FIG. 1. A HARRIS COTTAGE. NO BIOLOGICAL EXAMPLE OF MIMICRY COULD HAVE BEEN MORE PERFECT.

see and read Harris without the light of just such a trip as we must take, perforce. Not only must we learn to love the treeless hills, discovering other beauties which compensate, learn to accustom our ears to the constantly spoken Gaelic, but we have yet to learn the A B C of those lives, silent, forceful, spent on those islands in con-

stant endeavor to wrest from nature a bare existence. This you begin to learn as you sail in and out, touching at this port and at that.

By the chain of Royal Mail Steamers we are carried from Glasgow to our final destination. As we pass from steamer to steamer we begin to realize why this line has such a reputation even on our side of the Atlantic, for at every hand one finds a thoughtful courtesy which we soon learn to be so characteristic of the men of this line. From Glasgow to Oban, the Queen of the Highlands; Oban to Fort William at the foot of Ben Nevis; Fort William to Mallaig (the most beautiful short stretch of railway in the British Isles, and the only bit of land travel on the trip); Mallaig to Kyle of Lochalsh, well worth more than a brief visit with its views of loch and sea; Kyle over to Portree (Isle of Skye); and Portree across to Harris; such is the route.

By the time Harris is reached, one has learned many things, both of nature and human nature. We look at the shores approaching, with open eyes ready to see into the heart of things. A grey sky, a grey blue sea, grey rocks with no sign of habitation. A stretch of land with the bones of its formation showing through with patches of soil between. Where are the people? It is a surprise to see one of the masses of grey rock slowly resolve itself into a house or hut. No biological example of adaption to environment, or mimicry, could have been more perfect. As the steamer skirts the shore, we see narrow strips of lighter green; "corn" the Mate tells us. Remembering the English use of the word "corn" to indicate grain, we are not surprised to see soon that it is Scotch oats, not maize. Each row about a foot wide, four or five side by side, they wander in a desultory fashion along the slope. Each little stone cottage has its painfully small number of rows. They seem to be placed along the lines where the gracious nature of these islands has vouchsafed enough soil for them to grow. Between rocks, here and there, the lines of green wander. All the patches in sight on the island if placed together would not make one of our ordinary fields. Fishing, a patch of oats, and a few sheep; this constitutes the cottagers means of livelihood.

Landing at Tarbert, the town of the island, we come back along the hills seen from the steamer. Treeless hills, green where the soil is thick enough for sod to grow, stretch on before us, the grey rock, a gneiss, cropping out at every turn. One comes across, here and there, stacks of peat neatly arranged. First cut, dug, then dried

in small quantities and finally stacked. Having preconceived notions of the locality possible for peat bogs it is a surprise, to say the least, to find them here crowning the rounding summits of hills. Levels or hollows seem in no way necessary for a bog. The "boggiest" place I ever stepped into was the side of a hill whose slope was at a high angle.

The road wanders over the hills in an inconsequent way. Sheep stray across the path but seem woefully shy of the camera. Around the corner comes softly a serious-faced young woman, with a roll of cloth on her back. She is dressed simply and neatly, her skirt turned carefully back and pinned up to her waist. She is barefooted, but her stockings and shoes are seen hanging at her back. On nearing the town she will stop by one of the brooks, wash her feet, put on her shoes and stockings, unpin the skirt and enter the wee metropolis of the island. We pass on, wishing devoutly that we could have understood the soft words of greeting as she passed. To be where nothing but the Gaelic is spoken, and never to have been fortunate enough to acquire it, makes one feel helpless indeed.

Once over the brow of the hill one of the crofter's holdings comes in sight. A little cottage built of stone with a thatched roof of straw, the simplest, least progressive form of crofter's hut has for its only opening, the doorway. Here and there a crevice may be left between the stones to allow some of the soot to pass out. A hole is also left in the roof, into which a barrel is neatly fitted. This hole with its barrel constitutes the chimney. Entering the house it seems perfectly dark but for the glowing mass of peat in the middle of the floor. Looking up, you see that it is located directly under the barrel opening, while suspended from the roof is a heavy iron chain with an immense hook for the kettle or other cooking utensil. Smoke and soot, some of it, finds its way up to the hole in the roof and thence out. Some escapes through the crevices, the rest attaches itself to the walls of the room. That fascinating odor of burning peat which greets you secretes itself in every thread of the tweed that the woman is weaving and comes across the Atlantic to us to give a touch of the "heimweh" for the land of our summer sojournings. So characteristic is the faint odor of peat in all the Harris cloth that some manufacturers of machine-made tweeds burn peat near their goods to deceive the public into thinking them the "hand-made."

On we go, for my kindly guide has a special cottage in mind where the various processes of weaving may be better seen. Her

English into Gaelic, Gaelic into English, has helped me out of many a difficulty and her sympathetic knowledge furnished a key to these silent lives. A sudden turn from the road and we strike across the moor. On a rock I noticed what seemed to be the remains of a wig, a radient Titian red in hue. Picking it up, it turned out to be a bit of soft silky wool, not short and tightly curled but in strands and weaved. But whence the glorious color, the rich red brown? I soon found I had stumbled upon the first steps in the series of the tweed. Near by stood a kettle and the remains of a fire. Here the crofter's wife had been making the dye with which to color the wool. Painstakingly, slowly, she had collected from the grey rocks, the foliaceous lichen *Parmelia saxatilis,* Gaelic, "crotal," which clings so closely. By boiling it here in her open air laboratory she has made the rich red brown dye, then dipped the wool into it and spread it out on the rock or low bushes to dry. Should she have wished another color she has learned to use the root of the Iris growing there in that pool near us. The heather which crowns the moor with its hardy bloom she may make pay its tribute, a beautiful green, to the cloth to be. Nearly every dye used by the Harris weavers is a natural dye. Most wonderful of all is the origin of a brilliant yellow with a tint of brown. Soot! the black soot from the burned peat gives this brilliant coloring. That the islanders should have discovered for themselves such an extensive list of dyes utilizing the scanty gifts of nature to effect so many shades, gives us some idea of their indomitable will and energy. At least twenty of these are vegetable dyes, obtained of course, from the flora of the island. In addition to these there are the "natural sheep greys" and "browns" where the wool is not dyed but used as it is in its natural color. The tints and shades of the various colors are obtained by a longer or shorter boiling. When woven into the cloth, two or three of these colors may be combined. For example, of the material brought home, there are the following combinations:

I. Threads of heather green, natural sheep brown and white.
II. "Crotal" (lichen), white wool and napweed.
III. Soot yellow and heather green.

Reaching the cottage whose dye pot and drying wool we have been inspecting, we may see the next process the wool undergoes. Quietly and easily the crofter's wife manipulates two very awkward paddles beset with teeth like a curry comb. With these she cards the wool, pulling it apart, teazing out the separate strands and finally with a deft little movement lays the strip of wool on the back

of the paddle, gives it a little rub with the back of the other one and the operation is completed. Result, a narrow strip of light fluffy wool, ready to be fed to the spinning wheel. It looks remarkably simple to do, but experimenting reveals your utter helplessness over so simple a feat. Over in the corner stands the small spinning wheel, for everything in this minature home must accord. The illustration shows the carded wool lying across the woman's knee as she feeds it to the swiftly moving wheel.

FIG. 2. THE SPINNING WHEEL.

Refreshed by a glass of pure rich milk, for the crofters are most hospitable, we inspected the mass of wood with its numerous threads stretching from part to part. It seemed a cross between a four-post bed and an organ in appearance. On the long organ seat sat the weaver, her feet and hands constantly moving with the rhymthic fling of the shuttle. On this cottage loom, the cloth slowly comes into being. Harris tweed is single width and to those who have seen where it is made it is a surprise that it has any width at all, so tiny are the rooms in which the crofters live and work.

The cloth woven, it is taken from the loom and "wauked."

After being soaked in hot water and a strong solution of soda to take out the oil, it is placed on the "wauking board," a long piece of wood with grooves in it like a scrubbing board. A number of women sit at each side and "wauk" the cloth back and forth. Soap is rubbed on. This to shrink it and get the remaining oil out. Jolly are the times at the "wauking." The hum of voices and songs resemble more than anything the "quilting bees" of our grandmothers. In this way the cloth is cleansed, shrunk, and the fibres closely interwoven.

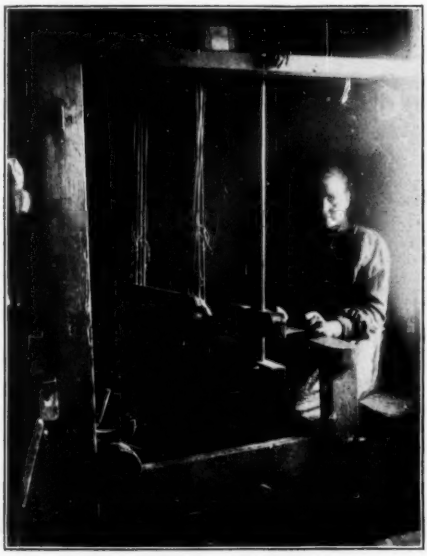

FIG. 3. ON A LONG ORGAN SEAT SAT THE WEAVER.

The "wauking" over, the piece of tweed has still rough times in store for it before it is finished. Down by the burn or loch the women may be seen washing and beating the cloth with a stick to get all the soap out. It seems incredible when handling the soft beautiful cloth when dry, that it has ever survived such a stormy history. Thoroughly washed and chastised, it is rinsed until the water runs clear. Dried in the open air, exposed to sun and rain, it is finally rolled into balls and carried on the back of some lass to town. It is claimed for the Island tweeds that they never

fade, never shrink and never wear out. At first this seems incredible; but a glance back over the "making" leaves one firmly convinced that to have survived the trials and tribulations thus far, argues an indefinite lease of life for the slight vicissitudes of the wearing epoch.

Turning, we catch a last glimpse of the weaver returning over the hills to the small bit of land she calls "home." How many weeks of toil does the single roll represent which she has left to be sold! Strong and peaceful is the face she turns toward the setting sun. With unwavering faith she passes resolutely back to the bare living, scanty provisions and constant struggle of her everyday life, leaving in our hearts a wonder and a strange humility.

DECISIONS OF U. S. BOARD ON GEOGRAPHIC NAMES. JUNE 5, 1900 TO JANUARY 8, 1902

I

Alamoosook; lake in town of Orland, Hancock Co., Me. (Not Great (pond).)

Ambrose; the channel across Sandy Hook Bar, New York Harbor, formerly known as East Harbor, was renamed Ambrose Channel by an Act of Congress approved June 6, 1900. In that Act it is "*Provided,* That the so-called East Channel across Sandy Hook Bar, New York Harbor, for the improvement of which provision was made by the River and Harbor Act, approved March third, eighteen hundred and ninety-nine, shall hereafter be known as Ambrose Channel." (Statutes at Large, 56th Congress, 1st session, pp. 588 and 627.) The name Ambrose is here included *not* as a decision of the Board, but as a decision by Congress.

Anchor; passage in Behm canal between Bell Island and the mainland, southeastern Alaska. (Not Anchorage.)

Año Nuevo; bay, creeks, island and point, San Mateo Co., Cal. (Not New Year.)

Ansley; island in Swanson Harbor, Chatham strait, southeastern Alaska. (Not Astley.)

Aowa; creek Dixon Co., Nebr. (Not Aoway nor Ayoway.)

Apple; group of islands, in northern part of Sitka sound, southeastern Alaska. (Not Iabloshni, Middle nor Sredni.)

Aultmans; run, tributary to Conemaugh river, Indiana Co., Pa. (Not Altman nor Altman's.)

Barren; run, tributary to Jacobs creek, Westmorland Co., Pa. (Not Barnes.)

Basket; bay, indenting the southeastern shore of Chichagof island, southeastern Alaska. (Not Kakagin nor Kook.)

Bendel; island, between Big Koniuji and Nagai island, Shumagin group, Alaska. (Not Morse.)

Bentley; P. O. and R. R. station, Baltimore Co., Md. (Not Bentley Springs.)

Bloyd; mountain, Washington Co., Ark. (Not Bloyed nor Bloyd's.)

Bobs; creek, Lincoln Co., Mo. (Not Bobbs nor Bob's.)

Bois d' Arc; creek, Ellis Co., Tex.

Bois d' arc; creeks (two), Choctaw Nation, Indian Ter.

Bois d' arc; post office, Greene Co., Mo.

Bois d' arc; river in Northern Texas.

Bois d' arc; township, Montgomery Co., Ill.

Bolden; run, Franklin township, Fayette Co., Pa. (Not Boland.)

Bonnie Doon; P. O., Santa Cruz Co., Cal. (Not Bonny Doon.)

Bowlens; creek and mountain, Yancey Co., N. C. (Not Bolens.)

Brewer; pond, Penobscot Co., Me. (Not Orrington Great.)

Broad; island, near the junction of Hooniah sound and Peril strait, southeastern Alaska. (Not Crosswise, nor Poperetchni.)

Brockatonorton; bay, in Chincoteague bay, Worcester Co., Md. (Not Bockatonorton nor Parkers.)

Buncombe; creek, Chickasaw Nation, Indian Ter. (Not Boncombe.)

Bynum; P. O., R. R. station and run, Harford Co., Md. (Not Binum, Bimans, Bynhams, etc.)

Cacaway; island and point, Langford bay, Kent Co., Md. (Not Cacawa.)

Calabazas; creek, tributary to Sonoma creek, Sonoma Co., Cal. (Not Calabezas nor Calebezas. Calabazas is Spanish for *pumpkin, calabash,* etc.)

Camp Coogan; bay, in eastern part of Sitka sound, southeastern Alaska. (Not Camp Cogan, Camp Kogan, Kadiak nor Nachlezhnia.)

Cane; mountain, Yancey Co., N. C. (Not Caney nor Caney River.)

Cane; P. O. Yancey Co., N. C. (Not Cane River.)

Cane; river, Yancey Co., N. C. (Not Caney.)

Carasaljo; lake, Ocean Co., N. J. (Not Caracaljo.)

Carmichaels; borough and P. O. Greene Co., Pa. (Not Carmichael nor Carmichael's.)

Carroll; glacier reaching the sea at head of Queen inlet, Glacier bay, southeastern Alaska. (Not Woods.)

Cascade Springs; post village, Fall River Co., S. Dak. (Not Cascade.)

Catlin Mill; creek, branch of Catharine creek, Schuyler Co., N. Y. (Not Catharine Mills.)

Chikasanoxee; creek, tributary to Tallapoosa river, Chambers Co., Ala. (Not Chickasonoxie, etc.)

Chilson; lake, Essex Co., N. Y. (Not Long Pond nor Paragon Lake.)

Chiniak; cape, the easternmost point of Kadiak, Alaska. (Not Greville, Hermogenes, St. Hermoneges, Spruce, Tolstoi, Tuniak nor Yellovio.)

Chiwawa; creek, lake, and P. O., Ferry Co., Wash. (Not Karamin nor Karamip.)

Cliff; point on southeastern shore of Pearse Island, Portland Inlet, southeastern Alaska. (Not Base nor Rose.)

Cliffs; point, Chester river, Kent Co., Md. (Not Cliff City, Cliff's nor Starts.)

Coatue; beach and point, Nantucket Harbor, Nantucket, Mass. (Not Bogue, First nor Hanloetoe.)

Cohobadiah; creek, tributary to the Little Tallapoosa, Cleburne and Randolph Counties, Ala. (Not Cohabadia nor Hobadijah.)

Comet; peak, Pinal Co., Ariz. (Not Camels nor Comets.)

Conaskonk; point, Monmouth Co., N. J. (Not Conaskonck.)

Cone; mountain on the east bank of Stikine river, near the Alaska-Canada boundary. (Not Cane.)

Coskata; beach, life-saving station and pond, Nantucket, Mass. (Not Coskaty nor Croskaty.)

Cotteral; brook, Ocean Co., N. J. (Not Cotterall's.)

Craigville; P. O. and R. R. station, Orange Co., N. Y. (Not Craigsville.)

Cove City; township, Crawford Co., Ark. (Not Core.)

Curlew; creek, lake, and P. O., Ferry Co., Wash. (Not Karamin nor Karamip.)

Cutnose; creek, tributary to the Little Tallapoosa, Randolph Co., Ala. (Not Cutnoe nor Cut Nose.)

XUM

Dirickson; creek, tributary to Little Assawoman Bay, Sussex Co., Del. (Not Herring nor Williams.)

Donohoe; R. R. station, Westmoreland Co., Pa. (Not Donahoe nor Donohue.)

Douglas; post village and town, Worcester Co., Mass. (Not Douglass.)

Douglas; bay indenting south coast of Kupreanof Island, Summer Strait, southeastern Alaska. (Not Douglass.)

Doves; cove in Bush river, Harford Co., Md. (Not Dove nor Dove's.)

Eagle Crag; mountain, east of the Stikine river, near the Alaska-Canada boundary line. (Not Eagle.)

East Douglas; P. O. and R. R. station, Worcester Co., Mass. (Not East Douglass.)

Edmondson; mountain, McDowell Co., N. C. (Not Edmonson nor Edmundson.)

Emmet; P. O., R. R. station and township, Nevada Co., Ark. (Not Emmett.)

Entiat; river, Chelan Co., Wash. (Not En-ti-at-kwa, Entiatqua, etc.)

Eyak; lake and native village, at western edge of Copper river delta, Alaska. (Not Eyack, Eyuk, Ighiak nor Ikhiak.)

Forest; lake, in Woodbury, Orange Co., N. Y. (Not Slaughter's Pond.)

Fryingpan; cove, Eastern Neck Island, Kent Co., Md. (Not Boxes nor Frying Pan.)

Gain; island near entrance to Snug Cove, Gambier bay, Admiralty island, southeastern Alaska. (Not Cain.)

Garrett; hill in Middletown, Monmouth Co., N. J. (Not Garret nor Garrett's.)

Garrett; island at mouth of Susquehanna river, Cecil Co., Md. (Not Watson.)

Gillespie; creek, Ohio Co., W. Va. (Not Gillaspies, Glasby nor Glyspie.)

Glenhaven; post office, railroad station and township, Grant Co., Wis. (Not Glen Haven.)

Going Snake; P. O., Cherokee Nation, Indian Territory. (Not Goingsnake.)

Goose; point, Chincoteague bay, Worcester Co., Md. (Not Clam.)

Goosmus; creek, Ferry Co., Wash. (Not Goos nor Koosmus.)

Grand Pacific; glacier reaching Reid inlet from the north, Glacier bay, southeastern Alaska. (Not Johns Hopkins.)

Gravette; P. O. and R. R. centre, Benton Co., Ark. (Not Gravett.)

Greely; point on mainland in Taku inlet, southeastern Alaska. (Not Greeley.)

Green; point on mainland near mouth of Stikine river, southeastern Alaska. (Not Zelonoi nor Zelony.)

Green; point, the northern point of entrance to Pyramid harbor, Lynn canal, southeastern Alaska. (Not Pyramid nor Zelonoi.)

Green; lake, Hancock Co., Me. (Not Reed's (pond).)

Greenlake; P. O. and R. R. station, Hancock Co., Me. (Not Green Lake.)

Green Run Inlet; life saving station, Worcester Co., Md. (Not Green Run.)

Greys; creek, tributary to Assawoman bay, Worcester Co., Md. (Not Gray's, Grey's nor Rileys.)

Griers; hollow, Franklin Co., Pa. (Not Greer, Greers, etc.)

Gross; point, the west point of entrance to Orland river, Hancock Co., Me. (Not Gross's, Leach's nor Spark's.)

Grove City; P. O. and R. R. station, Franklin Co., Ohio. (Not Grove.)

Guttenberg; P. O. and R. R. station, Clayton Co., Ia. (Not Guttenburg.)

Hallback; mountain, Yancey Co., N. C. (Not Hallbach, Hogback nor Horlbach.)

Hanani; creek, Chickasaw Nation, Indian Territory. (Not Haiyona nor Hiayona.)

Hardship; branch of Pocomoke river, Worcester Co., Md. (Not Hardshift.)

Heagan; mountain, Waldo Co., Me. (Not Heagen.)

Hill City; city, Pennington, Co., S. Dak. (Not Hill.)

Honeygo; run, branch of White marsh run, Baltimore Co., Md. (Not Herring nor Horning.)

Hound; island in northern part of Keku strait, southeastern Alaska. (Not Round.)

Howes; cave in Cobleskill, Schoharie Co., N. Y. (Not Otsagaragee.)

Howes Cave; P. O., Schoharie Co., N. Y. (Not Howecave, Howe Cave, Hows Cave nor Howe's Cave.)

Inner; point, on the southeastern shore of Kruzof island, Sitka sound, southeastern Alaska. (Not Rocky nor Second.)

Iskut; mountain and river tributary to the Stikine in southeastern Alaska. (Not Iskoot nor Skoot.)

Izhut; bay and cape on southeastern shore of Afognak island, Alaska. (Not Ijoot, Ishoot, Pentecost, Sharipof nor Whitsuntide.)

Janesville; mountain, N. E. from Port Chester on Annette island, S. E. Alaska. (Not Janeville.)

(To be continued.)

EDITORIALS

TEACHERS in all grades of elementary school work have a difficult task before them in any attempt to teach geography so that it shall meet the test of experts in geography, as well as in education, because the field to be presented is so involved and composite in character. The phase of geography that makes it one of the most important subjects in the elementary school curriculum is of course the life, or more particularly, the human side. Yet this aspect of geography is the most difficult to teach causally and understandingly, because existing geographical conditions are the result not only of the complicated influence of the interacting factors of the physical environment, but also are largely controlled by economic and social conditions that have been determined not by the features of the earth, but by the minds and hands of men.

Such topics in human geography as are the daily objects of study by pupils from the third to the eighth grade are in a reality so involved that they tax the powers of the most maturely trained geographer to analyze them successfully. Topics in political and economic geography are the special problems of university graduate students who have made themselves thoroughly masters of the elements of the many sciences and subjects that contribute causally to the determining of existing conditions.

Teachers forgetful or ignorant of the complexity of the problems appeal frequently for courses of study in the higher aspects of geography when they have had no training whatever in the basal phases of the subject, and feel incensed when it is suggested to them that there is no short circuit way of becoming independent in the field of human geography except by beginning at the beginning. Of course it is possible to give courses for untrained teachers devoted

especially to political and economic geography; but the subject matter presented in such courses must of necessity be a catalogue of facts that will make the teachers better encyclopædias of information but not necessarily better trained in geography, or with an increased ability to find new relations and to explain new problems. The facts gained from such courses will be largely used in the class room with quotation marks, because they have been memorized rather than absorbed.

Such courses have their value, however, in the chance given to outline some of the overlooked and fascinating problems of geography, which will inspire some few in the class to begin at the beginning and to work hard to become independent within a limited field. Yet the influence of superintendents and geographers should be exerted toward more serious work on the part of teachers. To be sure the teachers may think courses in the elements of climate and land geography too simple at first, but they soon find that all there is of value in any subject has not been presented, and never can be presented fully in the introduction to a school geography. Then they begin to work with a new vigor and in a new spirit, and prove the best of enthusiasts.

The short circuit method of learning geography is but an expedient that is perhaps better than nothing, but which should not be encouraged. The future of good school geography depends on the training of the teachers who are doing the work, and thus those training the teachers should work toward power, as is now being done in so many of the better normal schools, rather than for information, as has been the plan for so long.

GEOGRAPHY CURRENT

CARTOGRAPHY

The Latest Topographic Sheets.—The following contour maps have recently been issued by the U. S. Geological Survey.

Quadrangle.	State.	Scale.	Contour Interval.
Mount Mitchell,	North Carolina-Tennessee.	1–125,000	100
Connellsville,	Pennsylvania.	1–62,500	20
Anoka,	Minnesota.	1–62,500	20
Florence,	Arizona.	1–125,000	100

Mount Mitchell quadrangle, North Carolina and Tennessee, shows a topography resulting from a hard, rocky mass, covered with heavy forest, and subject to moderately heavy rainfall. The declivities are steep—too steep for cultivation except in the lower valleys. This quadrangle represents one of the highest and most rugged portions of the Appalachian region.

Connellsville quadrangle, Pennsylvania, shows a portion of a very celebrated coal region. It is mainly a roughly rolling region through which the main streams have cut profound gorges.

The Anoka quadrangle is one of the excellent examples numerous in Minnesota, of topography radically modified by the ice invasion of the glacial epoch. It is largely an area of glacial lakes and swamps, there being no less than thirty-five lakes, and large areas of swamp land. A portion of the city of Minneapolis occupies the southeastern corner. This quadrangle, together with the one to the south, called the Minneapolis quadrangle, show the greater portion of that city.

Florence, Arizona, quadrangle, illustrates one of the topographic characteristics of the ultra-arid region. The disintegration of the rocks, lacking the assistance of moisture, frost and vegetation, is slow, compared with erosion, hence the steeper slopes are largely rock, nearly bare of soil, and any disintegrated material is easily washed down into the valleys by the sudden showers of the arid region. Here the solid matter is deposited, the water being dissipated by evaporation and percolation, soon after reaching the level country. We have thus the sudden change from steep, rugged mountains, to perfectly smooth plain, almost destitute even of drainage lines. This contrast is plainly shown on the Florence sheet.

A. P. D.

CLIMATOLOGY

Wind Force in Tornadoes.—Professor F. H. Bigelow has published on page 633, International Cloud Report, Vol. II., Report of Chief of Weather Bureau, 1898–99, the results of his computation on the great waterspout seen off Cottage City, Mass., August 19, 1896. He gives the following additional facts: This large tornado tube or waterspout over the ocean was seen from several localities, and the direction noted so that it was easy to place its position on the map with much exactness. At the same time a series of large pictures were photographed by Mr. Chamberlain, of Cottage City, showing the spout in several positions relative to the landscape in the foreground. Pro-

fessor Bigelow visited the place and made a suitable survey of the distances so that the scale of the photograph was found, and from this the dimensions of the tube and the height of the cloud. By means of the proper formula the following dimensions in feet, and velocity in miles per hour for the different components were obtained:

Height above Sea Level.	Diameter of Tube.	Radial velocity outward.	Rotational velocity.	Vertical velocity upward.
Feet.	Feet	Miles.	Miles.	Miles.
4,200				
4,193	3,402	7.0	14.1	0.04
3,901	506	1.0	94.4	2.50
3,599	400	0.6	119.5	3.90
3,301	290	0.6	164.0	7.40
2,999	250	0.5	189.0	9.90
2,398	204	0.4	233.0	14.90
1,802	178	0.4	268.0	19.80
1,499	168	0.3	284.0	22.20
1,201	158	0.3	300.0	24.70
601	144	0.3	328.0	29.60
479	144	0.3	333.0	29.70
0	134	0.3	354.0	34.60

A more thorough study of the data shows that the lower portion of the vortex tube is enlarged over these diameters on account of the friction due to disturbing the water, to the raising of the spray to a height of 500 feet when it is cast out of the tube, and to the indraught of air required to supply the vortex. The effect of this is to increase the size of the tube at the ocean to about 200 feet, and to reduce the rotating velocity to about 300 miles per hour, and the vertical internal draught to about thirty miles per hour. These dimensions and velocities characterize the largest tornado tubes, and together with the fall of internal pressure by the amount of three or four inches, they readily cause the destructive effects noted so conspicuously at Louisville, Ky., and St. Louis, Mo., in recent years.—*Monthly Weather Review*, September, 1901.

H. H. K.

HYDROGRAPHY

Water Powers on an Ancient Seashore.—It is a well-known fact in geology that some of the oldest land in America is an area whose surface formation consists of hard granitic rock and extends along the Atlantic seaboard, about 100 miles inland, from the New England States to Georgia. The eastern edge of this area is known to have been washed in past ages by the waves of the Atlantic Ocean and to have formed the ancient shore line of the continent. Subsequently

by a general elevation of the whole country the shore-line retreated eastward, and the softer rocks composed of sands and gravel, which were before under water, became dry land. It is interesting to note that this old shore-line, where the hard and soft rocks meet, plays an important part in the present mercantile development of the country. All the rivers which flow east from the Appalachian Mountain system are obliged to cross both of these areas on their way to the sea, and in so doing have worn valleys in the face of the country. But owing to their hardness the ancient granitic rocks have withstood the action of the rivers more successfully than the softer sandstones, and a series of rapids and falls, where the two areas join, have been the result. So striking is this feature that the old shore line has come to be called the Fall Line in each of the states it crosses. Here are located a great number of important water-powers often in the heart of the thickly settled districts where the cheap power furnished by the streams can be used to great advantage in local industries. Some of the important rivers which cross the "fall line" in the South are the Savannah near Augusta, Ga., the Oconee at Milledgeville, Ga., the Ocmulgee at Macon, Ga., the Flint near Knoxville, Ga., the Chattahoochee near Columbus, Ga., the Tallapoosa near Tallassee, Ala., and the Coosa near Weetumpka, Ala., all of which make great shoals at these places. The utilized powers at these points are: 50 feet at Augusta, 72 feet at Columbus, and 104 feet at and near Tallassee. Immediately above the developed powers at Columbus there is an undeveloped shoal having a fall of 52 feet. The United States Geological Survey has instituted an investigation under the charge of Mr. B. M. Hall, of Atlanta, Ga., into the possibilities of these streams and has made many observations and taken numerous measurements of flow to secure information which will furnish a safe basis for their improvement for power and their use for supply.

G. B. H.

PHYTOGEOGRAPHY

Origin of Plant Societies.—Dr. H. C. Cowles has written in the *Botanical Gazette* on the origin, development and classification of plant societies, as illustrated in the vicinity of Chicago.* In a somewhat different form the same topics have been presented in *The Plant Societies of Chicago and Vicinity,* issued as a bulletin of the Geographic Society of Chicago. It is suggested that plant societies be classified in accordance with the laws of topographic change. Diversified topography means diversified ecological conditions; there are

* *Bot. Gaz.,* 31: 73–108; 145–182. 1901.

many hydrophytic lakes and marshes, many xerophytic uplands. But as land masses tend to approach a baselevel, so ecological conditions tend to become uniform; in favorable climates there comes to develop a widespread mesophytic forest. Thus there are definite orders of succession of plant societies, corresponding with definite topographic changes. Five distinct topographic series with their accompanying plant types are traced in the Chicago region: rivers, undrained swamps, uplands of clay, rock or sand, depositing shores, eroding shores.

G.

Vegetation of the Atlantic Coast.—Several important papers which deal with the vegetation along the Atlantic coast have recently appeared, and notices concerning them may be looked for in this place. The strand flora of New Jersey near Barnegat was studied by Harshberger from 1894 to 1900, and he has given us an interesting account of the coastal plant conditions.* The area presents lagoons, barrier reefs, low dunes not exceeding forty-five feet in height, beaches and marshes. Several southern species reach here their northern limit because of the mild climate. The lower beach is plantless and the middle beach is tenanted chiefly by succulents, as is true elsewhere. The dunes nearest the shore are covered largely with the sea sand reed (*Ammophila*) and the beach pea (*Lathyrus maritimus*); dunes farther from shore are clothed with the bayberry (*Myrica cerifera*) and Hudsonia. The thickest formations with gnarled and twisted asymmetrical trunks and the salt marshes are fully described.

H. C. C.

Ecology of Western Texas.—The ecological relations of the vegetation of western Texas have been fully and admirably presented by Dr. Bray.† After a discussion of climatic and soil factors, the highly divergent vegetation areas are presented. Though most of western Texas is xerophytic, mesophytic forests occur along the streams. Originally grasslands of the buffalo grass type were dominant, but as a result of over-pasturage and the checking of fires, the thickets and forests are now rapidly encroaching upon the grasslands. The increase of the chaparral is especially marked. Various types of chaparral are found, and areas in which cacti, yuccas and agaves rule are common.

H. C. C.

* *Proc. Acad. Nat. Sci.*, Philadelphia. 1900. Pp. 623–671.

† *Bot. Gaz.*, 32: 99–123; 195–217; 262–291. 1901.

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The New Bureau of Plant Industry.—The report of the Secretary of Agriculture for 1901 contains interesting statements concerning the new Bureau of Plant Industry and the work of the various divisions which have been included in the organization of this Bureau. The divisions now brought into the new Bureau are those of botany, plant physiology and pathology, pomology, grasses and forage plants, experimental gardens and grounds, and the introduction of foreign seeds and plants. When these divisions were working without such a central organization as that now planned, some duplications and omissions of work were inevitable. It is believed that although each of the divisions has done excellent work, efficiency will be greatly increased through these new relations to one another.

The amount of work accomplished by these various divisions during the past year is very large and we have included a statement of but a part of the results. The persons having charge of the introduction of seeds and plants from foreign countries have been successful in encouraging the cultivation of Japanese rice in Texas and Louisiana, to such an extent, that our importations of this article have been reduced from 154,000,000 pounds annually to 73,000,000 pounds. The Dakotas, Kansas and Nebraska are beginning to raise Macaroni wheat. The introduction of date palms from Africa, and recently from Egypt, into Arizona and southern California has met with marked success. The fact that through the efforts of this division of the Bureau Egyptian cotton is now being grown successfully in this country becomes especially noteworthy when we consider that we now import annually about $8,000,000 worth of this article.

The divisions of plant physiology and pathology, and of botanical investigations report important work upon the insect and fungus diseases of cotton, orchard fruits, forest trees and valuable timbers. It has been found that a species of cowpea, when used as an alternating crop with cotton, assists in inhibiting the effects of the fungus that so often destroys the roots of cotton plants. Considerable promise of success is had in the production of hardy hybrids of cotton and of orange plants. The production of coffee in Porto Rico has been receiving considerable attention, and since we now spend annually about $70,000,000 for this article it is obviously of great importance that Porto Rico's resources along this line be developed.

The cattle industry is beginning to show the effects of deterioration of the ranges, and a highly commendable attempt is being made to conserve and increase the efficiency of these regions. Congress

is recommended to establish an experimental range that will serve the cattle industry as the Arlington farm serves the farming industry.

O. W. C.

ECONOMIC GEOGRAPHY

RECENT ARTICLES ON COMMERCE AND INDUSTRY

American Desert, Wonders of the, *World's Work*, March, 1902.
Argentina, *Bradstreet's*, March 8, 1902.
Big Trees of California, *World's Work*, February, 1902.
Canals of the World, *Monthly Summary of Commerce and Finance*, December, 1901.
Carborundum Industry, *Manufacturer*, March 1, 1902.
China, Business Methods in, *Manufacturer*, March 1, 1902.
China, Trade of Swatow, *Consular Reports*, February, 1902.
City, The Twentieth Century, *The Current Encyclopedia*, February, 1902.
Coal, Anthracite in Pennsylvania, *N.Y. Price Current*, March 8, 1902.
Coal, Ocean Transportation of, *Consular Reports*, March, 1902.
Coal in France, *Consular Reports*, March, 1902.
Coal, in Germany, American, *Consular Reports*, March, 1902.
Cows, "Next to the Ground" articles, *McClure's*, March, 1902.
Erie Canal, *N. Y. Merchant's Assn. Bulletin*, December, 1901.
Germany, Economic Conditions in, *Manufacturer*, March 1, 1902.
German-American Diplomatic and Commercial Relations, *Review of Reviews*, March, 1902.
Great Britain, Economic Conditions in, *Consular Reports*, March, 1902.
Greenhouses, *Country Life in America*, March, 1902.
Iron Ore Handling at Furnaces, *Scientific American*, March 8, 1902.
Japan, Commercial, *Monthly Summary of Commerce and Finance*, December, 1901.
Leather and Hides, Foreign Trade of United States, *Crop Reporter*, December, 1901.
Linen Industry of Bohemia, *Consular Reports*, February, 1902.
Marine, How Countries Subsidize Their Mercantile, *Scientific American*, March 8, 1902.
Mexico, Labor Conditions in, *Bulletin of Department of Labor*, January, 1902.
Netherlands, *The Current Encyclopedia*, February, 1902.

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Niagara Power Plant, *Manufacturer,* March 1, 1902.
Persia, *The Current Encyclopedia,* February, 1902.
Porto Rico, *N. Y. Merchants Assn. Bulletin,* December, 1901.
Railroad Consolidations (with map), *World's Work,* February, 1902.
Retailer, Relations of Jobber to, *Comm. Bull. and N. W. Trade,* March 8, 1902.
Retailer, Installment Plan, *Comm. Bull. and N. W. Trade,* March 1, 1902.
Spring (farm tasks of March), *Country Life in America,* March, 1902.
Sugar-beet, Largest Yields, *American Agriculturist,* March 1 and 8.
Texas, Resources and Industries, *N. Y. Merchant's Assn. Bulletin,* December, 1901.
Tobacco, "Agriculture under Cloth," *World's Work,* February, 1902.
Transvaal, Railway Reorganization, *Engineering Magazine,* March, 1902. E. D. J.

Weather and Industry. *Recent Storms.*—The storms and floods which occurred in the northeastern states during the last days of February and the first days of March, 1902, afford an excellent opportunity to the teacher of commercial geography to enlist the interest of students in the study of the effects of such unusual events upon industry. The papers have recently been filled with the account of the floods at Passaic, Newark, and Paterson, New Jersey, where millions of dollars worth of manufacturing and household property have been destroyed. The trains on all trunk lines converging at New York were delayed by floods in Pennsylvania, New Jersey and New York. There were washouts on the Pennsylvania, Delaware, Lackawanna and Western, the Erie, the New York Central and the Jersey Central railways. The several railroads involved were obliged to rent the tracks of more fortunate competitors; the Erie used the Lackawanna and the New York, Susquehanna and Western; the New York Central used the West Shore and the Boston and Albany; while most of the lines south and west of New York used the Pennsylvania tracks to get into the city. The New York mail service has not been so demoralized in many years and telegraphic communication has been slow and by round-about lines.

Among the various items, one reads of stores damaged at Rochester, New York; bridges and factories suffering in the Housatonic valley, Connecticut; dangerous ice gorges formed on the

Ohio; mines flooded at Scranton, Pennsylvania; and thousands of men out of work at Pittsburg in the same state. In the anthracite coal region work was seriously crippled. No coal left Wilkesbarre, Pennsylvania, for two weeks. The Reading railway could hold open but six out of its thirty-eight collieries, while the other roads of the region neglected the shipment of small sizes of coal and fought to get through carloads of large coal necessary for factories and mills.

Seventy-five per cent. of the iron and steel mills of Pennsylvania, which lie mainly along the water courses of the state were crippled, and it has been estimated that along the Pittsburg and Alleghany rivers within a distance of sixteen miles fully seventy thousand men were forced into idleness and at least twenty-five thousand of these lost five or six days' work.

The floods were followed on March fifth by heavy snow storms throughout the east. This again congested traffic in New York City and suspended it outside. Thousands of men were called out to clear the streets, while teamsters charged exorbitant prices and extra horses were everywhere in demand to double up teams. Several vessels grounded while trying to make New York harbor in the snow storm and in the upper bay lighters, small vessels and even larger crafts were tied up for a day. The delay of railway freights found the jobbers of New York City frantic for goods to show visiting buyers or to fill orders already over-due. Provisions for the metropolitan market were delayed from two to three days in transit and when they did arrive there was a glut of produce in bad condition. Throughout the eastern states telegraph, telephone and trolley wires were broken down and thousands of men were thrown out of their customary employments while thousands of others were engaged in repairing the damages wrought.

The organization of industrial interests is indeed marvelous; but as yet there is no means in existence to estimate the thousand various losses society suffers from a great storm. The items recorded in the press afford, however, an unusual opportunity to gain a conception of the multitudinous social effects of natural phenomena and the tangle into which the fine adjustments of industry may be thrown by their violence. E. D. J.

The Niagara Power Plant. — According to *The Manufacturer,* of March 1, the Canadian Company, which is now excavating a wheel pit and tunnel for an electric power plant above the Horseshoe Falls

at Niagara, has given the contracts for some remarkable generators to the General Electrical Co. which mark a revolution in electrical practice. The generators, 5,000 horse power, now in use on the American side have always been considered marvellous. The current from them is of low potential and is transformed to 2,200 volts for transmission. The new machines will be of 10,000 horse power each and will produce a current of the tremendous initial potential of 12,000 volts. This gigantic and novel equipment is calculated to effect a very large saving in the cost of power production and promises to add to the attractiveness of Niagara Falls as a centre for manufacturing. E. D. J.

Shipbuilding.—In 1901, according to the *N. Y. Prices Current*, there were built in the shipyards of the world 1661 vessels of 3,085,086 gross tons. The four leading nations in shipbuilding were Great Britain, with 680 vessels and 1,736,708 tons; the United States with 303 vessels and 481,138 tons; Germany with 117 vessels and 284,063 tons; and France with 111 vessels and 232,404 tons. Sailing vessels constituted a large part of the tonnage built in France and a small part of that of Great Britain and Germany.

It appears that the *Celtic* and *Oceanic* are not to be the largest things in the matter of size in shipbuilding, nor the *Deutschland* the greatest development in speed. The Hamburg-American Line has awarded the contract for a steamship to be 725 feet in length or 21 feet longer than the *Oceanic*, and to develop a speed of 25¼ knots an hour, which is 12 hours hours faster than the *Deutschland*. E. D. J.

Maple Syrup Industry.—Maple trees are known in many parts of the world, but it is only in North America that the sap yields abundance of fragrant and wholesome sugar products. Even of the American maples only one is known as a sugar maple, and this is the common "hard" or "rock" maple. The income from the maple product of the United States in a single season has reached $1,250,000. It is impossible for the farmer to make money more rapidly in four to six weeks' time in any other branch of his occupation. Early spring is sugar making time, ploughing is still several weeks off. When alternate thawing and freezing weather begins the farmer taps his tree. A half-inch auger is employed to bore the tree to a depth of two inches and a metal spile is inserted in the opening. On this a four-gallon tin pail is hung. No soft maples

or trees less than ten inches in diameter are tapped. In a tree with a diameter of five feet, four or five holes may be bored; in the average tree but two. In the sugar-house the sap is concentrated by evaporation until it reaches the standard of eleven pounds to the gallon. Much less maple sugar is made to-day than in years past, and vastly more syrup. A gallon of syrup makes seven pounds of sugar. The average yield of a sugar tree is about a gallon of syrup in a season.—*Country Life in America*, March.

A Pumping Engine on Wheels.—Western ingenuity has devised various ways of supplementing the water supply needed for irrigation in certain sections where the natural flow in the ditches is apt at times to be insufficient. Wind mills, stationary pumps driven by steam or electricity, and other devices have been employed, but the method described below is both unique and interesting. It consists in the use of an 18-horse power gasoline engine, which its owner has mounted on a wagon and moves from farm to farm to pump water in Capay Valley of western California as necessity requires. The engine uses 22 gallons of fuel in a working day of ten hours, and the pump which it drives is of the centrifugal pattern with a capacity of 700 gallons per minute. By means of this pump water is raised directly from the river often to a height of 55 feet and forced through an eight-inch pipe directly to the field to be irrigated, thus saving the expense of a share in the usual supply canals which bring water down from the higher levels of the streams and conduct it to the fields. The average cost of operating this pumping engine is $1.00 per acre. This enterprise is described in a recent issue of the Water Supply and Irrigation Papers of the United States Geological Survey, and is interesting as showing the value of water in the West and the skill and ingenuity practiced in getting it.

G. B. H.

The Chinese New Year.—More than a month after we have finished wishing our friends "A Happy New Year" and long after we have forgotten some of the good resolutions made on the first day of January, the sons of the Celestial Empire, wherever they may be, celebrate with music and feasting the opening of *their* new year.

Los Angeles, like other Pacific Coast cities, has its "China Town," that is, its Chinese quarter, and this concentration of the popula-

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tion helps to preserve Oriental costumes and customs. This year the celebration of New Year began on Thursday evening, February 6th, and continued for about a week. Strange to say it does not begin on exactly the same date each year. "The Chinese year is similar to the Mohammedan in having twelve months of twenty-nine and thirty days alternately; but in every nineteen years there are seven years which have thirteen months. This is not quite correct, so the Chinese have formed a cycle of sixty years in which period twenty-two intercalary months appear."

The holiday is a time of general rejoicing and good fellowship. Animosities and jealousies are forgotten. Debts are paid and forgiven and feasts and fireworks are in order. Curious so-called musical instruments emit strange sounds and equally strange are the sounds which pass for singing. In front of the shops and dwellings are hung large cage-like structures covered with bright paper, each containing a light. These lights burn by day as well as by night.

The best garments are worn and sometimes the costumes are very striking. A common combination consists of a black silk cap with a scarlet button, a pink jacket, a blue or purple pair of trousers, white stockings and black shoes with white soles.

Although this is a time of general hilarity, there is very little disturbance, for the Chinaman is, as a rule, a peaceable fellow, and simply wants to be allowed to celebrate his own holidays in his own way. J. F. C.

GEOGRAPHIC TEACHING

Inaccurate Pronunciations.—In some of the most recent as well as in the older text-books of geography used in our schools not a few inaccurate pronunciations are distinctly authorized in the pronouncing vocabularies. For example, the stress in Bagdad is properly on the second syllable, not on the first; in Bolivar, on the second syllable instead of the first; in Celebes, on the second syllable instead of the first; in Galapagos, on the second syllable instead of the third; in Pelawan, on the second syllable instead of the third; in Sarawak, on the second syllable instead of the third; in Monaco, on the first syllable instead of the second as one of our leading reference books gives it. A school text-book, above all things, should not mislead. C. C. A.

A Test of Geographical Books.—Mr. E. R. Wethey, of the Bradford Grammar School (England), offers the following pointed sug-

gestions in reference to gauging the value of school books in geography, that are worthy of note in this country.

"The commonest fault and perhaps the most difficult to remedy is that of 'out-of-dateness.' In the whirligig of African affairs, Geographies of 1900 are out of date by 1902. Nevertheless there are certain bases on which the merits of a book—looked at from this one point of view, viz., 'up-to-dateness'—may be gauged. For ourselves, when confronted with a 'new' Geography, we instinctively turn to Africa to see if the Kong Mountains have disappeared, to Asia to ascertain whether Indian spellings have been revised in accordance with the modern system, to North America to examine how far the giant progress of the United States in industry and commerce has been recorded, and to Western Europe to observe whether the 'Gulf stream myth' is still accepted without modification. If the book passes muster on these points it is fair to assume that it is for teaching purposes up-to-date. It is the business of the teacher to *keep* it up-to-date.

"In forming opinions on books we are guided largely by (1) accuracy of subject-matter, (2) clearness of exposition, and (3) up-to-dateness of information."

GEOGRAPHIC LITERATURE

BOOK REVIEWS

Lessons in Physical Geography.—Charles R. Dryer. American Book Company, 1901. Pp. 430, with 347 figures. $1.20.

The text-book of physical geography by Professor Dryer is easily readable by pupils in the first year of the high school, and has been found adaptable to the grade of pupils for which written. Technical terms are in large part avoided, and when used are carefully discussed.

The scope of the book is a wide one, yet the information given on each part is definite and so presented that the various chapters are correlated. Hence the beginner does not look upon each as a part by itself, but as a part of a united whole.

The first chapter on the "Earth in Space" supplies what has not hitherto been fully available in text form, that is, the relation of the planet earth to the other members of the celestial sphere. This chapter is successful in that it avoids the use of a large amount of technical information concerning the stars and planets. The apparent rotation of the heavens is explained by some simple observational experiments which bring readily to the mind of the pupil the ideas of latitude and longitude.

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The book devotes a large proportion of its space to the study of the *lands*, thus recognizing their claim to prominence. Throughout the text is well illustrated by diagrams, maps, and by clear-cut photographs of the typical land forms. The other important chapters of the volume are devoted to a consideration of the atmosphere and of plant and animal geography. The life side is thus strongly represented.

The material found in the main part of the book can be used entire by almost every geography class, and the author seems to have kept strongly in mind the idea of the geographic cycle. The book keeps the scholar awake to the ever-acting forces of nature which surround him, and trains him to observe local features—a valuable point. C. W. G.

Our European Neighbors.—Edited by William Harbutt Dawson. Five volumes completed. Two in preparation. 18.5x12 cm. cloth. G. P. Putnam's Sons, New York and London. Price $1.20 net.

I. FRENCH LIFE IN TOWN AND COUNTRY. Hannah Lynch. Pp. 311; Ill. 12. 1901.

II. GERMAN LIFE IN TOWN AND COUNTRY. William Harbutt Dawson, author of "Germany and the Germans." Pp. viii+323; Ill. 16. 1901.

III. RUSSIAN LIFE IN TOWN AND COUNTRY. Francis H. E. Palmer. Pp. xi+320; Ill. 15. 1901.

IV. DUTCH LIFE IN TOWN AND COUNTRY. P. M. Hough. Pp. vii+291; Ill. 16. 1901.

V. SWISS LIFE IN TOWN AND COUNTRY. Alfred Thomas Story. Pp. viii+282; Ill. 20. 1902.

For collateral reading in the higher grades, and in and beyond the high school, for the use of teachers, reading circles, and clubs, and for the personal satisfaction of obtaining in a thoroughly delightful form intimate present-day information concerning the lives of our European neighbors, the series, whose titles are noted above and the several books of which are of such uniform excellence, is invaluable.

Many chapters require a maturity of mind not commonly found below the high school, yet numerous passages can be chosen which are unexcelled for illuminations of grade lessons on the geography of Europe.

The series is written especially for English readers, but, excepting perhaps in the volume on German Life, this fact does not obtrude. A general plan has been followed in the volumes thus far presented, in accordance with which the "Intellectual life of the various people, their manners and customs, wealth and poverty, their armies, their industrial life, rural life, religious life, home life, amusements and local governments," are considered, but so much latitude has been given for special features of the different countries that this uniformity of plan has in no way interfered with the charming originality of the treatment in the several volumes.

Each volume has a fair share of illustrations. For the first of the series copies of famous paintings of French scenes and French life are used, which while very pleasing and of undoubted educational value do not serve the purpose of illustrating the text. In the later volumes photographs of the real places and people give much greater satisfaction. Yet a "geographic-minded" person regrets the absence of map or sketch to recall the location of districts, provinces and towns as they are being discussed.

The spicy portrayal of the contrast between town and country life in France; an introduction to the unique life of the "Canal Population" of Holland; a corrected notion of what military life means to Germany; the breath of free wild Alpine air; the vivid and at times even poetic descriptions of peasant characteristics and customs in Russia; these are but few of the many delights awaiting the readers of these altogether charming volumes.

K. H. G.

A Text-Book of Commercial Geography.—Cyrus C. Adams, B.A., F.A.G.S. 12 mo. Pp. xvi + 505; 158 maps and charts and 17 illustrations. Appleton's series of "Twentieth Century Text-Books," edited by A. F. Nightingale, Ph.D. Appleton & Co., New York, 1901.

This is the best text-book upon Commercial Geography which has yet appeared. The work is modelled upon much the same lines as the works of Andree-Deckert, or Zehden, or Marcel Dubois, but it is more compactly filled with useful information than these: it has the advantage of being thoroughly up-to-date, and it is written from the point of view of American readers, as may be seen from the fact that in the review of the industries and commerce of various countries the United States is given eleven chapters out of a total of forty-eight.

Texts upon commercial geography may be divided into two classes according as their principle of arrangement is to discuss one trade or trade product after another, or to present a picture of the industry of one country after another. Mr. Adams occupies a middle position by "treating each product in the chapter relating to the commerce of that country in which the production or manufacture of the commodity is specially prominent." The author has avoided the mistake of most of his predecessors in not allowing his discussion of commodities to carry him too far into the minor products nor his geographical review to involve him at length in the description of nations of little commercial importance.

The book may be recommended without reserve; its style is clear and very concise; the maps are extraordinarily good for a book of such small page dimensions; and the illustrations are numerous and direct from photographs. Mr. Adams is to be congratulated upon his work. Teachers of commercial geography are fortunate in the opportune publication of a text so admirably adapted to their needs.

E. D. J.

The Story of Nineteenth Century Science.—Henry Smith Williams. 20x13 cm. T. Y. Crowell and Co., New York, 1902. Pp. vii + 417; figures, illustrations and maps, 156. Price, $2.00.

Several books of the nature of Williams' "Story of Nineteenth Century Science" have made their appearance in the past year or so, but they are usually confined to a somewhat narrower field, thus making a more adequate treatment possible. But the widest scope has its value, and all well-educated people will welcome such a general review of progress along all lines of science. The difficulty of such a task is great, involving as it does a very extensive training, and the grasp of a wealth of literature, often polemic and with results more or less indeterminate. To sift this great mass of literature and make a plain statement of the principles which have been threshed out by

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the giants in the various lines of science, is a herculean task, and one may easily forgive many shortcomings in the one who bravely essays the labor.

Mr. Williams is not perfect, but he has made a very helpful book. Teachers in many lines of science will be very much helped toward a good perspective in their work by a perusal of this book. Here one gets a good bird's eye view of the status of science in general at the close of the eighteenth century, and then the gradual unfolding of the great principles is followed, in astronomy, paleontology, geology, meteorology, physics, chemistry, biology, anatomy and physiology, scientific medicine and experimental psychology. Geography as a science is effaced—but in five major sciences from which geography appropriates data, so good a perspective is furnished that the geography teacher will not be willing to complain.

One might wish a more adequate presentation of meteorology, the youngest of the physical sciences—and yet the one in which the largest quantum of accurate data is already charted over the earth's surface. In the list of unsolved problems also, it would have been helpful to show how an application of the kinetic theory of gases to the Laplacean hypothesis makes necessary a complete reconstruction of our notions regarding the origin of the solar system.

The book is well printed, and has a wealth of illustration, in quality of reproduction not always satisfactory, but well chosen and of high value.

J. P. G.

Who's Who in America.—A biographical dictionary of notable living men and women of the United States. Edited by John W. Leonard. 20x15 cm. A. M. Marquis and Co., Chicago, 1902. Pp. 1302. Price, $2.75 net.

"Who's Who in America" is a convenient book for any table or library shelf. It is packed with information of a purely personal, biographical nature, about the people of more than local distinction in this country. For each person entered there is recorded the name, date and place of birth, education, family relations, achievements, honors and present address. The book supplements the regular cyclopedia of biography, in the present, which is the second edition, there being 11,551 names. It is not a society blue book, but is a purely democratic record of the people who are now accomplishing things, and who are more or less in the public eye.

In geographic reading one meets the names of Powell, Gilbert, Chamberlain, Russell, Davis, Walcott, Agassiz, Deyer, Gannett, Redway and many others, recorded in generous detail. In short, it is a very useful book. It deserves and will have a very wide use.

J. P. G.

The Wide World.—A Geographical Reader.—The Youth's Companion Series. Ginn & Co., 1902. Pp. vi + 122, illustrated.

The first little book in the new series of geographical readers from the firm of Ginn & Co. is made up of a series of short chapters dealing with the home and child life of different countries. The chapters are by different authors, and have been selected from articles that have appeared during the last few years in the *Youth's Companion*. The book is planned for beginners in geography, but certain chapters are too difficult for small children. The selection has been well done and the matter presented is interesting even to

an adult. The illustrations are not very effective, as they are sketches, many of which are in bad proportion.

The eighteen chapters are arranged so that one is general, five are devoted to China and Japan, two to Egypt, six to the several countries in Europe, and three to America, excluding the United States. The book, therefore, fits its title, "The Wide World," and is a well-planned introduction to the series. It is hardly to be expected, however, that the volume will rival in popularity the classic Seven Little Sisters, by Miss Andrews.

R. E. D.

Around the World, Third Book, Home Geography for Fifth Grade.—Stella W. Carroll and Estelle M. Hart, edited by Clarence F. Carroll. Morse Company, New York and Boston, 1901. Pp. 270. Illustrated. 40 cents.

The third book of the Morse Company's Geographical Reader Series is devoted to the geography and life of the United States and its possessions, and is made up of many short chapters, each devoted to some single topic, supposedly of interest to children of the fifth grade. The chapters are arranged in a somewhat hit-or-miss way, and the book as a whole lacks unity and hence strength. The several chapters are written in choppy, somewhat disconnected sentences, and are not smooth or inviting reading. Much of interest is presented in reference to the different topics, but rarely is a topic treated with sufficient completeness to be satisfactory.

The illustrations are numerous and usually well chosen, but many are poorly reproduced and lack clearness. They thus lose their value as sources of information, and as objects of study. As a whole the book is disappointing, especially as compared with its predecessors. R. E. D.

The Great Deserts and Forests of North America.—Paul Fountain. 23x15 cm. Longmans, Green & Co., New York, 1901. Pp. ix+295.

During the third quarter of the last century the author, an Englishman, wandered over the wilder portions of our country, and now gives us the results of his observations. We are granted a view of the great plains, of the Okefenokee swamp, of the arid regions of the southwest, and of the western trail across the Rockies to Yosemite Valley. In natural and unstilted language we are told of the beauty and grandeur of plain and gorge and sunset, of waterfalls that temporarily turn the wild westerner from profanity to prayer. But these descriptions serve chiefly to make known to us the homes of beast and bird and flower. In this connection we are told of the brutal extinction by the white man of ten million buffalo and hordes of Indians. In short, this is a book of natural history told by the frontiersman, and an interesting book it is, albeit without scientific pretensions. It is for general reading and not for reference. Comparatively little is said of our forests—a disappointment after having read the title of the book. F. A. McK.

Forest Trees and Forest Scenery.—G. Frederick Schwarz. 19x13 cm. 12mo. The Grafton Press, New York, 1901. Pp. xiv+183. 26 illustrations.

This is in no sense a scientific book, but to one who loves to roam alone among the trees, or to float upon the pleasant waters of flowing adjectives, it offers much. The artist's eye for the beautiful is seen on every page, and

is equally evident in the dainty printing, illustrations, and binding of the book. The author's æsthetic personification of the individual trees, and his socialization of the forest aggregates, while perhaps not uncommon in idea, has been carried out with entire consistency. Throughout, despite an evident fear of even the slightest of scientific nomenclature or utilitarian exposition, we are made aware of the general distribution of our American forests, and we are told of the characteristic features of some half a hundred trees. And finally, in a chapter on the artificial forests of Europe, there is the gentlest of hints that perhaps the æsthetic ends of the landscape gardener might be combined with the utilitarian purposes of the forester. The book is the poetic approach to the now popular subject of forestry. F. A. McK.

The Story of Paper Making.—J. W. Butler Paper Company, Chicago, 1901. 20x13 cm. Pp. viii + 136. 16 full page illustrations. Price, $1.25.

There are many technical treatises on paper making, books intended for the specialist in manufacture, but up to date the absence of any adequate non-technical work upon the subject has left in the dark the student who is interested in this industry as one of the growing lines of industrial activity which make our country the leading commercial nation.

The book under review is timely. It will serve admirably as a reading lesson in industrial or commercial geography, giving as it does, a proper perspective to the industry, describing in easy language the various processes in the manufacture of paper, and showing with many full page illustrations, the various stages in the transition from rags or fibre to the finished product.

There are chapters on articles supplanted by paper, such as clay, wood, bone, papyrus and parchment; origin and early history of paper, and early methods of paper making; modern paper making; water marks and varieties of paper; and extent of the paper industry in the United States.

The book is well written, up to date and authoritative. It is a pleasure to recommend it to teachers and schools. J. P. G.

Les Cerfs Volants.—J. Lecornu. 24x16 cm. Librairie Nony et Cie, Paris, 1902. Pp. iv + 240; 160 illustrations.

The possibilities for aerial navigation were never brighter than at the present moment. After untold effort we seem just on the brink of accomplishing the wish of the ages. The problem has been attacked scientifically, the data of aerial dynamics and the mechanical conditions necessary for flotation carefully determined. A leader in this line is S. P. Langley, of the Smithsonian Institution, who has given us a successful flying machine. Another is Mr. A. L. Roteh, of the Blue Hill Meteorological Observatory, near Boston. The work done here has been a practical development of the kite as an instrument for the exploration of the upper air, and it has materially advanced our meteorological knowledge.

So the kite has become an efficient scientific instrument, a veritable soaring weather bureau station, with automatic recording instruments bringing down to us the data of the weather elements aloft.

M. Lecornu's book, then, is timely. It gives us a brief historical sketch of the kite, and the principle of flotation simply stated. Instructions follow as to construction in its various forms, simple, multiple, cellular and oriental. Then

comes an account of the use of kites in sport, in war, to carry a camera aloft for bird's-eye views, and in the exploration of the upper air, recording the air temperature, pressure and humidity, the wind direction and velocity.

The volume makes an interesting addition to the popular literature of meteorology. J. P. G.

Irrigation in the United States.--Frederick Haynes Newell, Chief of the Division of Hydrography of the United States Geological Survey. Size, 7½ x 5. T. Y. Crowell and Co., New York, 1902. Pp. vii + 417; figures, illustrations and maps, 156. Price, $2.00.

A timely and interesting publication is the latest work on irrigation by Frederick H. Newell, Chief of the Division of Hydrography, of the United States Geological Survey. From his official position, and as government expert on irrigation, the author has had unusual opportunities to study the conditions of irrigation in this country and abroad. These opportunities are abundantly reflected in the breadth of treatment and copiousness of detail of the present work.

The book is intended to show the conditions which make irrigation necessary in the West, the development it has there reached, and the methods of its practice. This is done in a readable presentation of the facts, unburdened by technicalities, which will be of general interest. The attempt is made not only to present the whole subject in a comprehensive manner to the general reader and student of economics, but also to give items of interest to the farmer and cultivator of the soil in showing just how the various operations of irrigation are carried on. Numberless suggestions are given as to ways of reclamation of the drouth-stricken land, particularly those which do not involve the expenditure of large capital, but which are of the nature of home-made devices. Thus the man who is contemplating settling in the West, or the homeseeker who is looking for an opportunity to acquire land in the vast public domain finds here just the information he needs for guidance.

To the descriptions of conditions and methods are appended: a chapter on Irrigation Law, presenting many interesting features which have developed under the varying phases of practice; and chapters summarizing the peculiarities and extent of the irrigation movement in each of the western states. Copious and suggestive illustrations, selected from the files of the United States Geological Survey, add much to the value and attractiveness of the volume.

The work is something more than an interesting description of the facts of irrigation. It is a comprehensive and authoritative summary of the subject, which makes it possible to view the irrigation of the Arid Lands in its broad national and economic relations to which public attention is now being called by pending legislation.

G. B. H.

NEWS NOTES

DR. HENRY C. COWLES, of the University of Chicago, will give a course in Ecology at the Marine Biological Laboratory, Woods Holl, Mass., July 2 to August 13. The course will consist largely of field work and lectures on the influence of ecological factors upon plant structures and functions, and on the physiographic development of plant societies. At the close of the session Dr. Cowles will conduct a four weeks' expedition to Mt. Katahdin and the Maine coast, to examine the ecological conditions, with special reference to Alpine and coast problems.

"THE COW PEA" is the title of the latest publication issued by the Experiment Farm of the North Carolina State Horticultural Society at Southern Pines, N. C. This book, neatly bound and illustrated in plain and concise manner, discusses the value and uses of this important crop, the Cow Pea. Every reader can get a copy free by writing to the Superintendent of Experiment Farm, Southern Pines, N. C.

AN INTERESTING and well illustrated pamphlet entitled "Rubber: What It Is, and How It Grows," has recently been issued for free distribution by the La Zacualpa Rubber Company, 713 Market Street, San Francisco, California.

MR. CYRUS C. ADAMS, one of the Associate Editors of the JOURNAL, has recently been appointed as Associate Editor of the *Bulletin of the American Geographical Society* of New York City. Mr. Adams will devote a large portion of his time to editorial work for the *Bulletin*, much greater than that given by any other of the associate editors. Mr. Adams, from his success as a writer and author, and from his wide reading in the literature of general geography, will add much strength to the *Bulletin*, and be of great assistance to the Editor, Mr. Hurlbut.